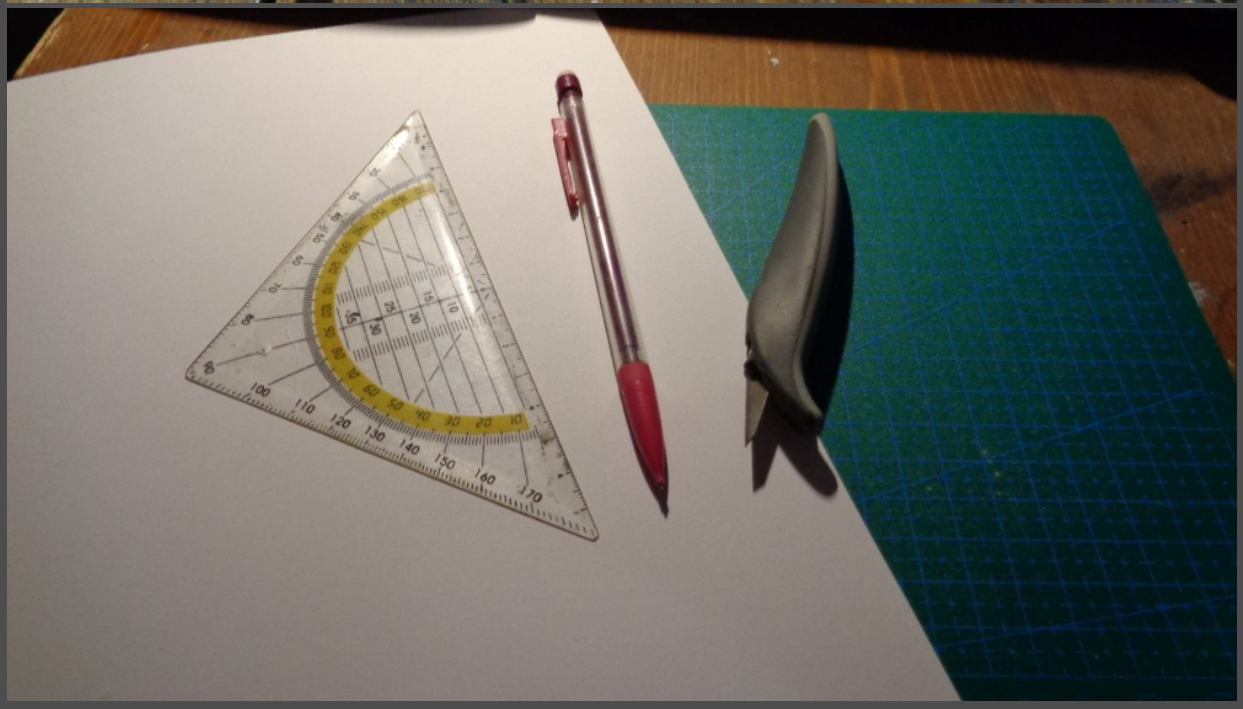
Bed lamp v2

Preface

In most cases you have a spontaneous idea that you like. Unfortunately the desire for a perfect product is unrealistic and you are disappointed by the first version. That's good, because it makes good products develop and bad products sort themselves out on their own. So I also liked the first version of my bed lamp and wished that it would be enough. Unfortunately it didn't, because the double-sided tape didn't hold and somehow it looked like something that was only installed as a temporary solution. Nevertheless, during the implementation I got some more ideas what I could change and on a Sunday I took the time to develop a prototype out of paper. Hint: This one only held for the photos, but altogether I came a step closer to my goal (a nice design lamp). Don't get discouraged after a first draft and avoid asking friends for criticism. One half can't imagine the idea in your head and the other half lies to you out of politeness. You won't get anywhere with that. It is always best to create a completely finished product and then ask other people (e.g. the Internet). With it you can gain a lot of useful information. In the second part we will develop our idea a little bit further.

Materials

With this development I have taken some material laymen from other projects, which I do not need any more there. We have removed this strange wine cork and will extract some parts from it. Since I want to protect the environment (and save money) I will not use the disposable batteries anymore, but a small rechargeable battery. I removed it from a drone, which gets a bigger one. Therefore we need materials to make a prototype out of paper. Since we will also build a small hole grid board, we also need tools for soldering.

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YC01 302035
3.7V 380mAh
H5J29 25C
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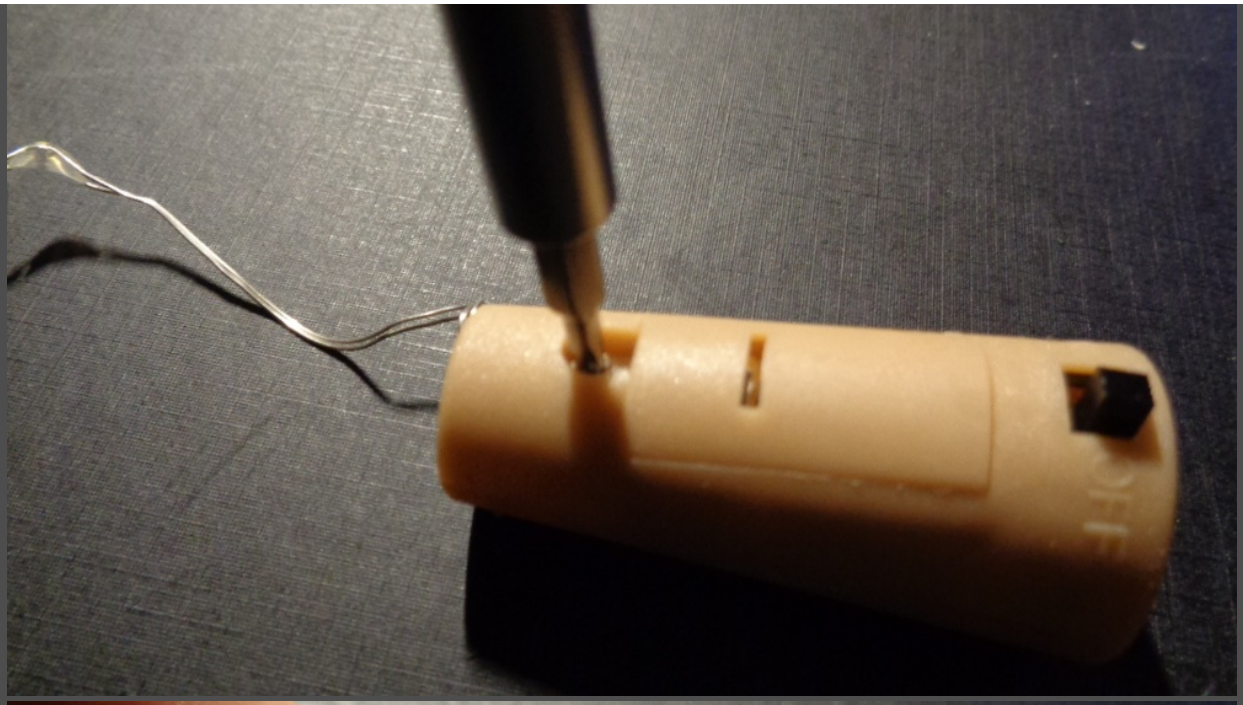
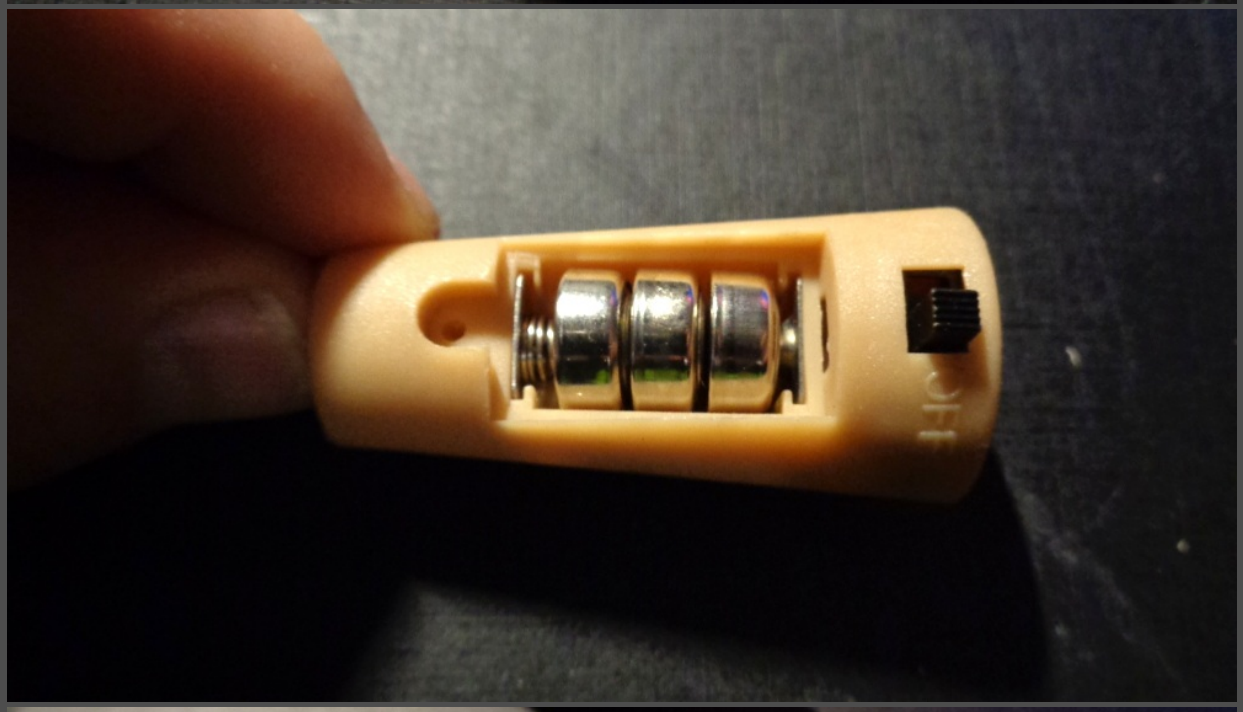
- Wine LED
- China USB cable (drone)
- 3.7v Battery (drone)
- Mechanical pencil
- Paper 160 g/m²
- Geodriangle
- Precision Knife
- Masking tape
- Screwdriver
- Crocodile clamps
- Breadboard
- Prototype cables
- Site cutter
- Solder and solder iron
- Hot glue pistol
- Prototype PCB
- Paper glue

Realisation electronics

Since we have a finished circuit, we do not have to worry about the individual components. All in all, this is not a big deal, but only consists of the LED chain, a switch, a resistor (16 Ω 5%) and a connector for the battery. Under this text I have created a simple drawing which shows our components in the right arrangement. I didn't draw the LED chain again and it ends on the right side of the graphic. So we can work with it and sit down to the project. This has now been implemented for beginners and in more professional projects everything looks completely different.

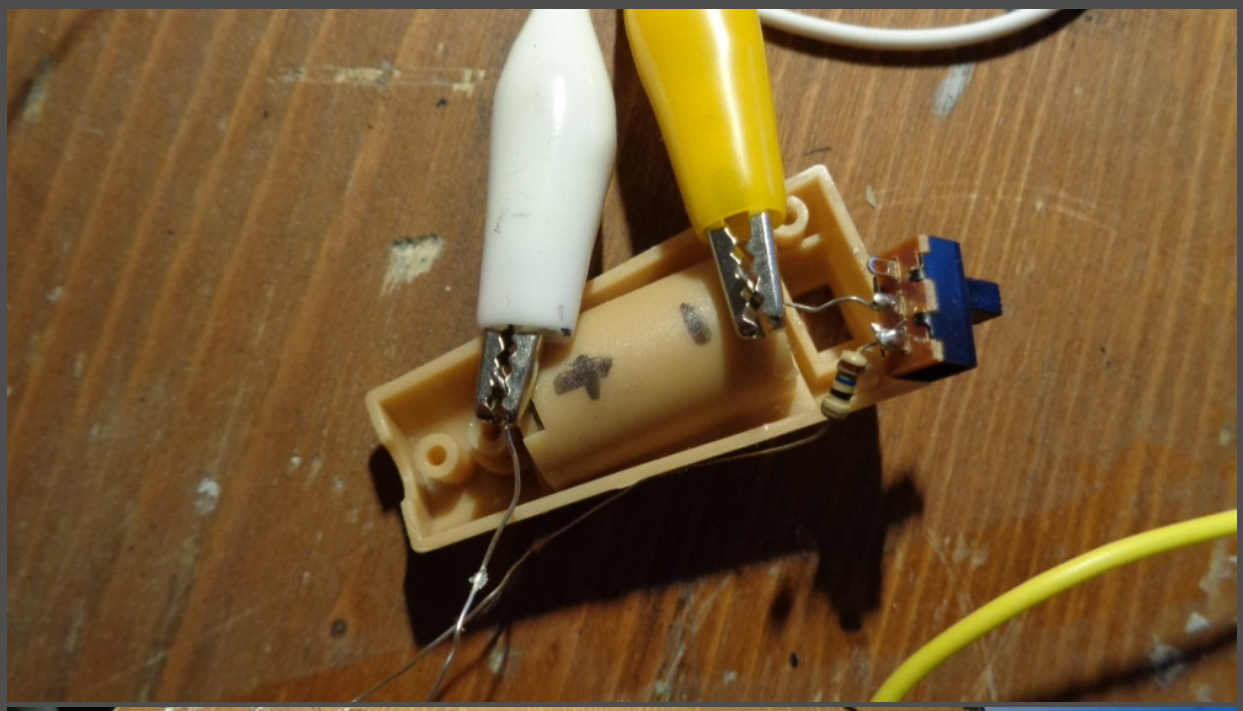
First we have to remove the components from the housing. To do this, loosen the screw from the cover with a cross screwdriver. In a small compartment there are three small button batteries. We pack them in a box and store them for other projects. The case has been glued together and must therefore be carefully broken apart with pliers. Please wear the safety glasses so that you don't get any plastic splinters in your eyes. I also stored the broken case because I might still be able to use it. I try to recycle as much of my materials as possible.

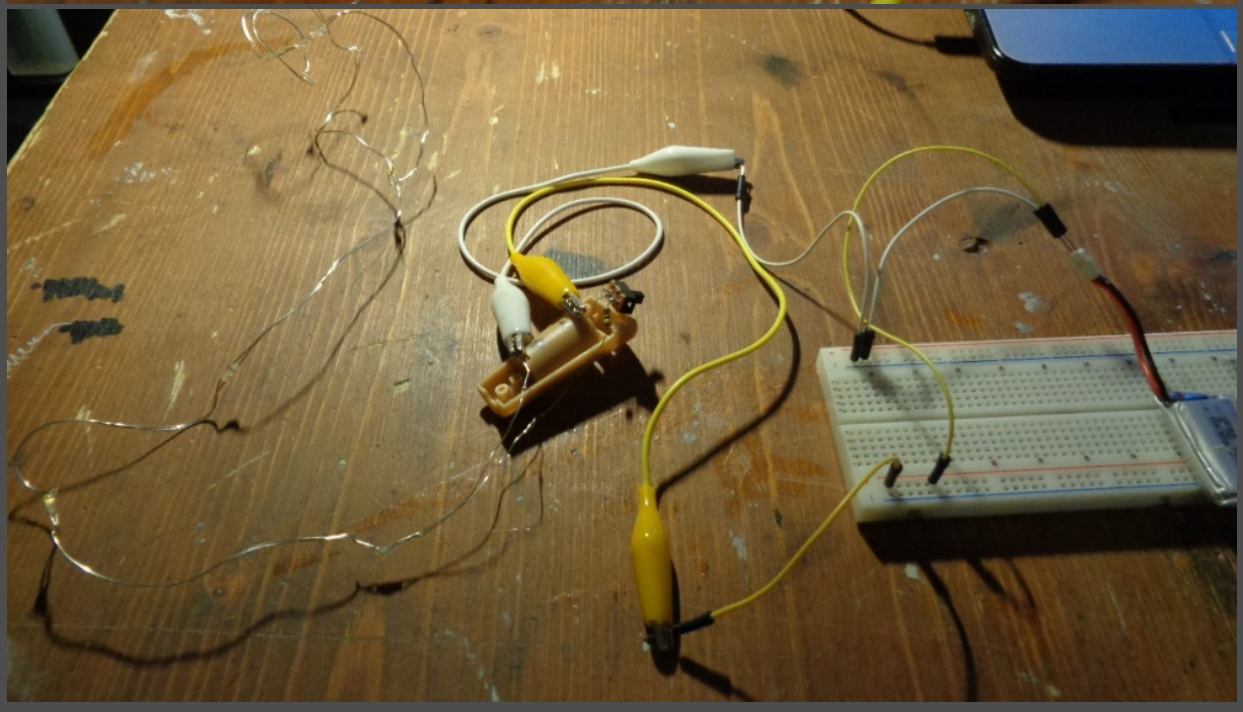


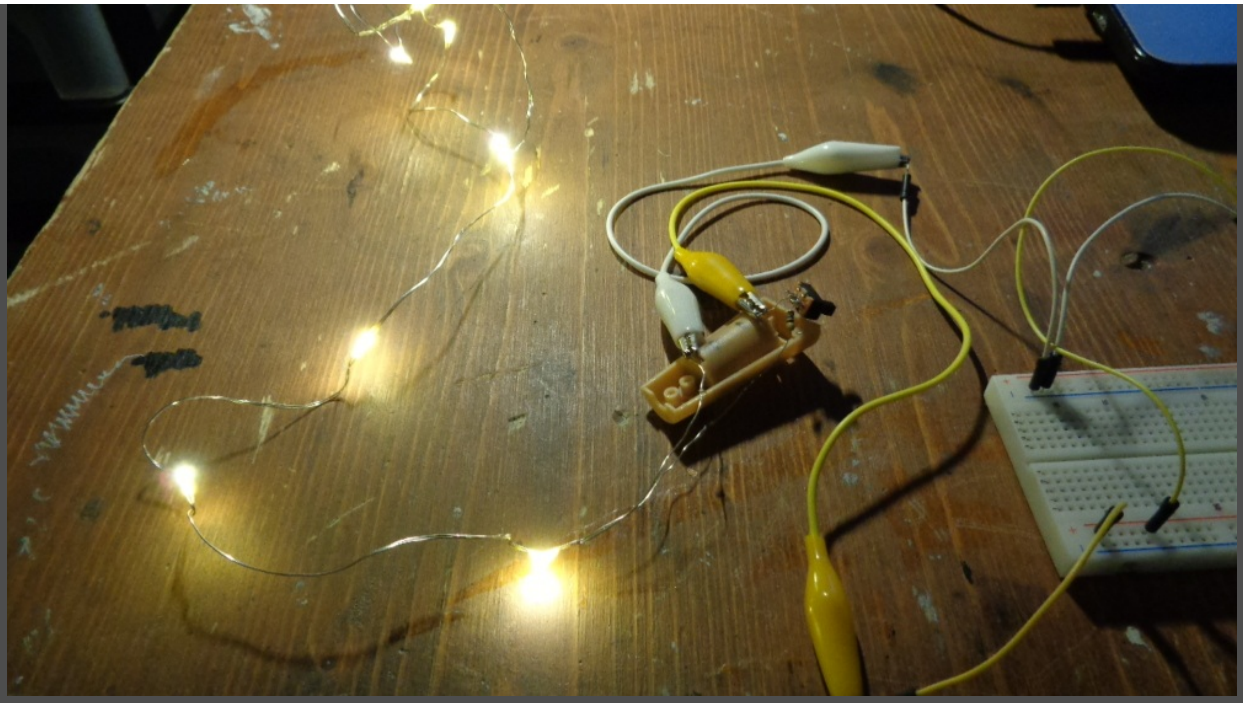


Before we solder we always build a provisional circuit (actually we have to calculate everything theoretically before, but this time we leave it out). For this we connect two crocodile clips with the

remaining housing at the contact for plus and minus. It doesn't matter which colors you use, because you just have to be able to distinguish between them. To be on the safe side, I also wrote Plus and Minus on the case with a black touch-up pencil so that I don't get confused. We connect the two ends of the crocodile clips with prototype cables, which in turn are plugged into a breadboard. The small battery is then connected to the breadboard. As I already mentioned above, you should calculate everything theoretically so that the LEDs don't burn out. I have simply guessed that the LED is operated with a voltage of about 3V. Please don't work so inaccurately if you use expensive materials, because if something burns out it can cost a lot of money. The LED cost now only 1€ and because it is a prototype, I wanted to implement this quickly. With time you get the experience when you have to calculate something and when you can cheat a little by ignoring the theory. In technical tests and for an employer the theory is always implemented.

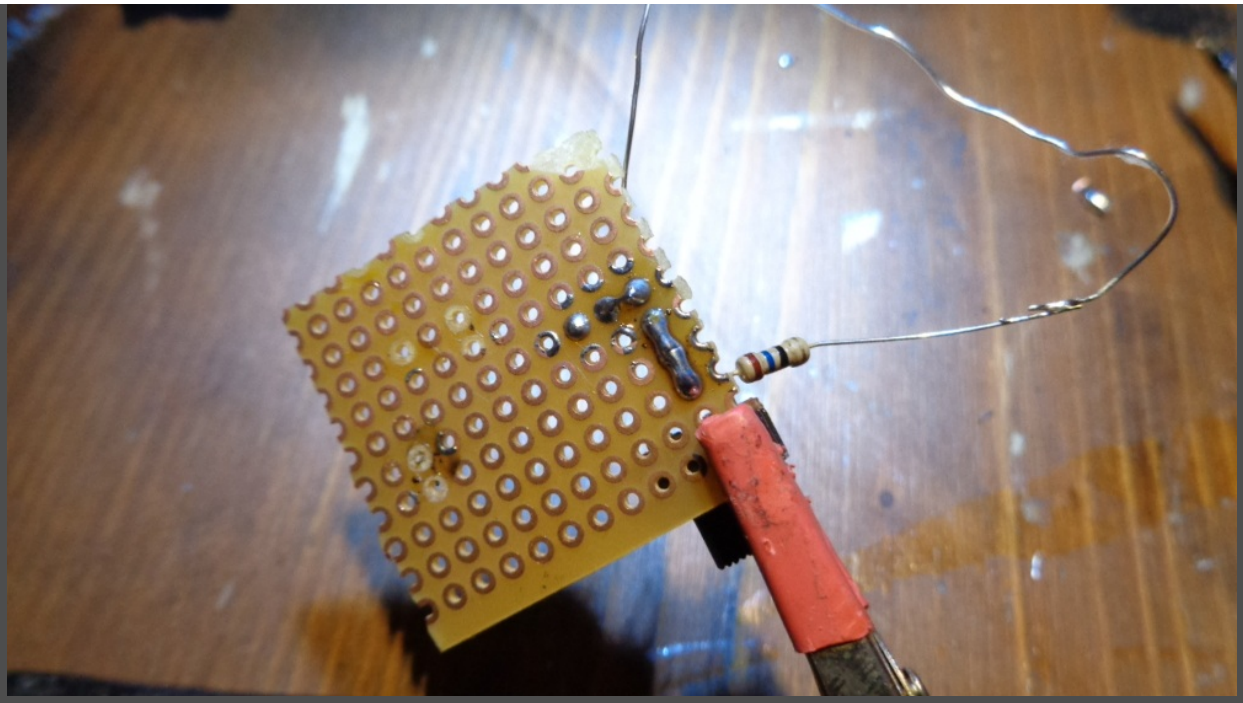




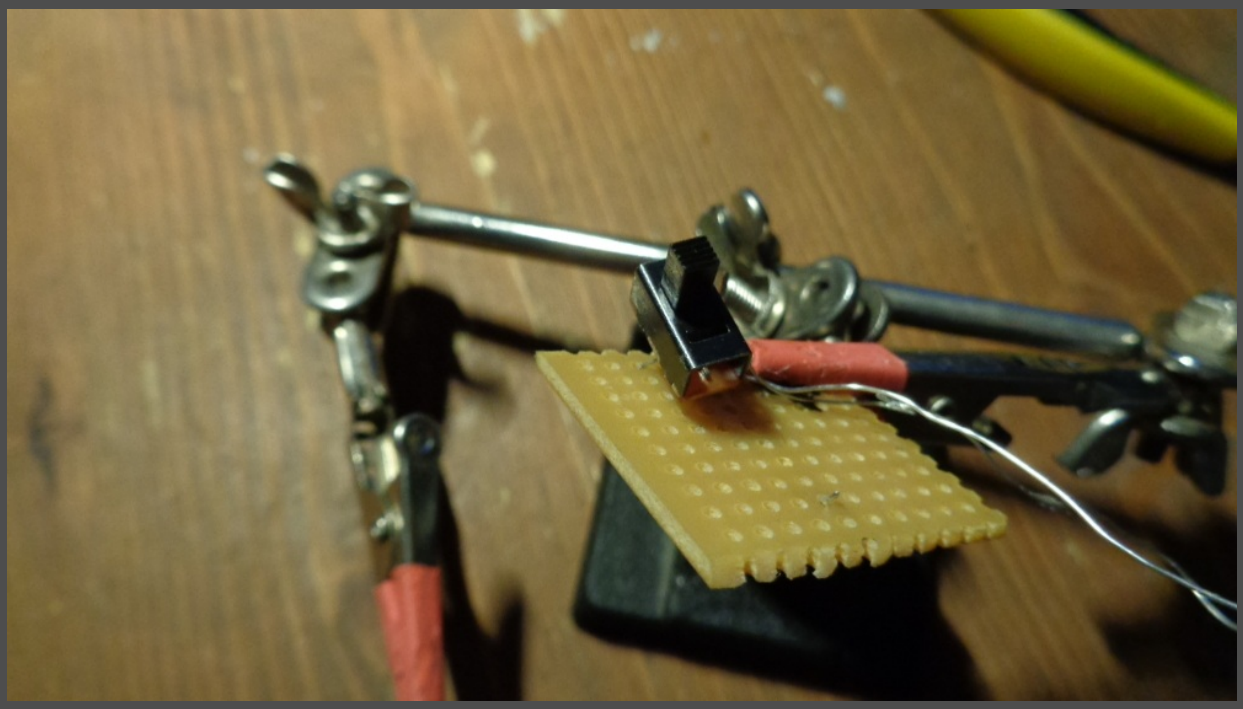


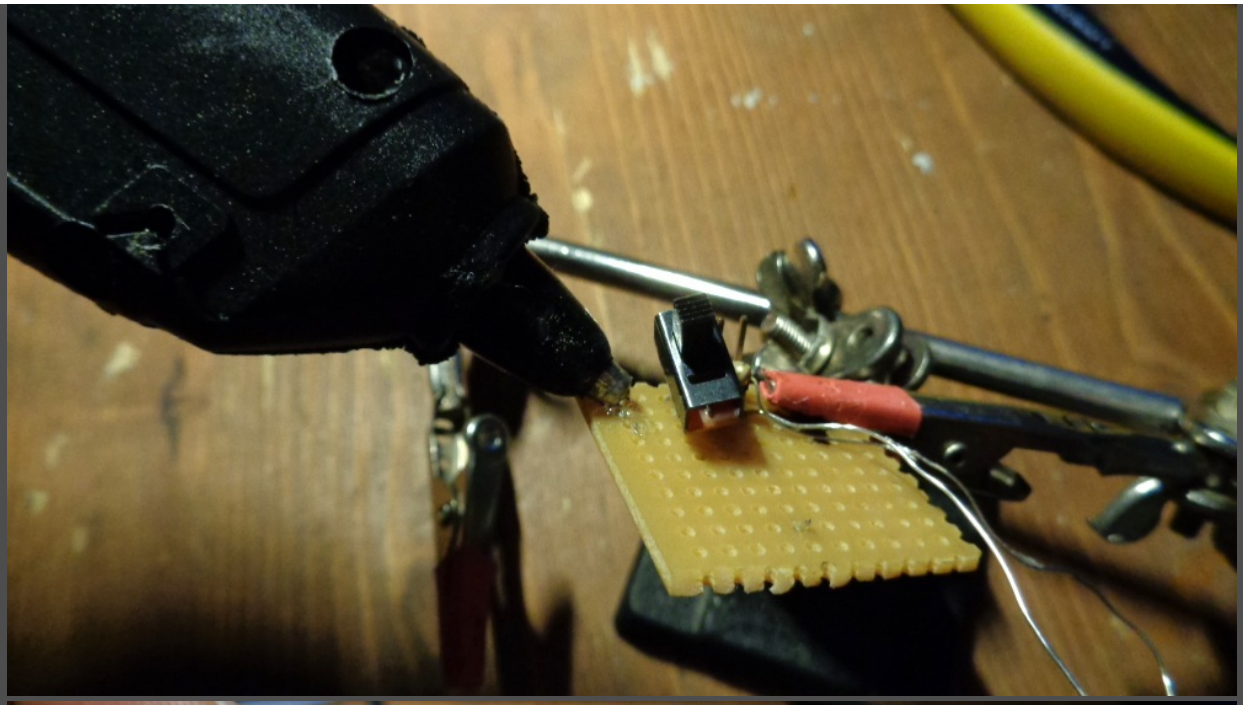
After we have connected all the components together, we can test the circuit. As you can see from the photo above, everything worked. For a bigger project I would let the battery run completely ler once, so I can estimate approximately how long the battery life is. In a professional project these are details you should write down, because you can gain points with potential investors in a product presentation. It is expected by a technician that he has measured or theoretically checked certain key points of his project. The same applies to software projects.

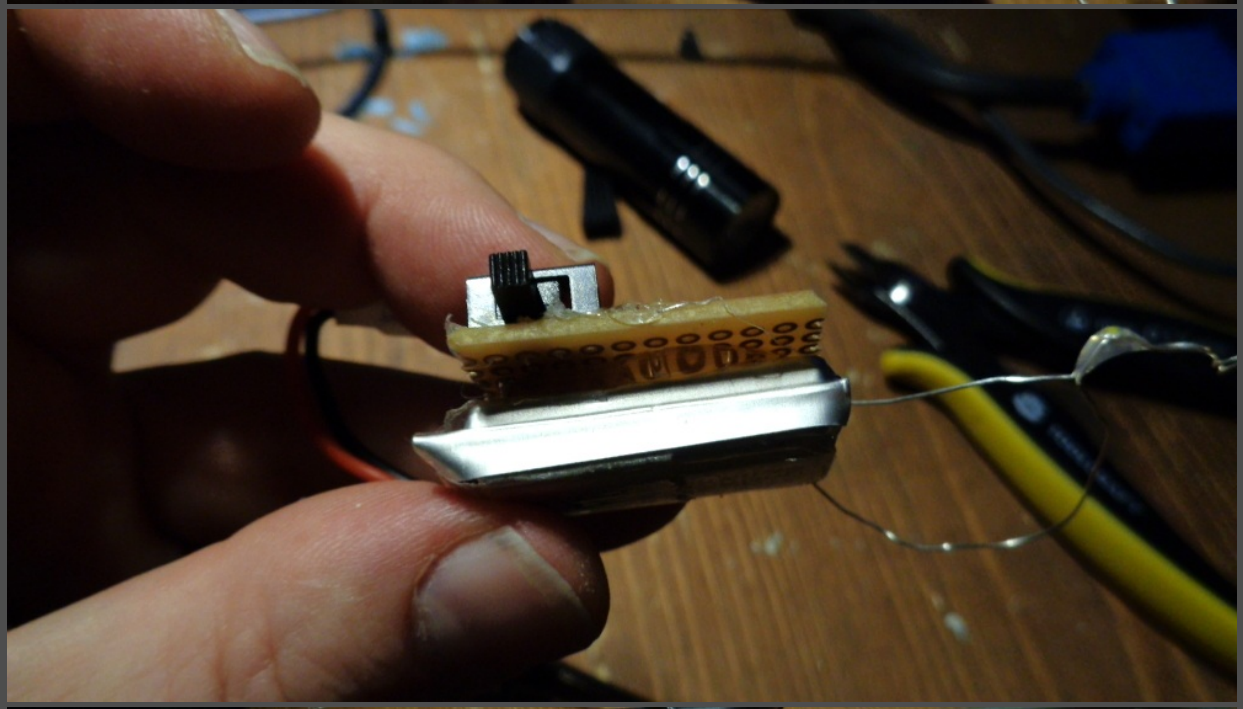
With a side cutter we separate the two connections from the housing to solder them on a hole grid board. This allows us to work better than with a plastic case, which also has a cilyndrical shape. If you order a hole grid board in the internet or buy it in a local store, you should take about twenty plates. From my own experience I can say that this helps to think and plan when developing a prototype, if you can take something into your hands that is almost like a real PCB. The actual process of soldering is not difficult, because we clamp the board into our helping hand and solder the connections together as shown in the technical drawing above.



After soldering I noticed that the switch was too loose on the circuit board. I only use hot glue in the NO case, because it is really difficult to remove and in many cases it looks unprofessional. You often see this in videos with 2.034.256 views. I glued the battery to the underside. If a battery gets too hot it can break and explode. You should rather use a rubber band or cable ties at this point. Unfortunately I didn't have both materials within reach and had to make do with alternatives.

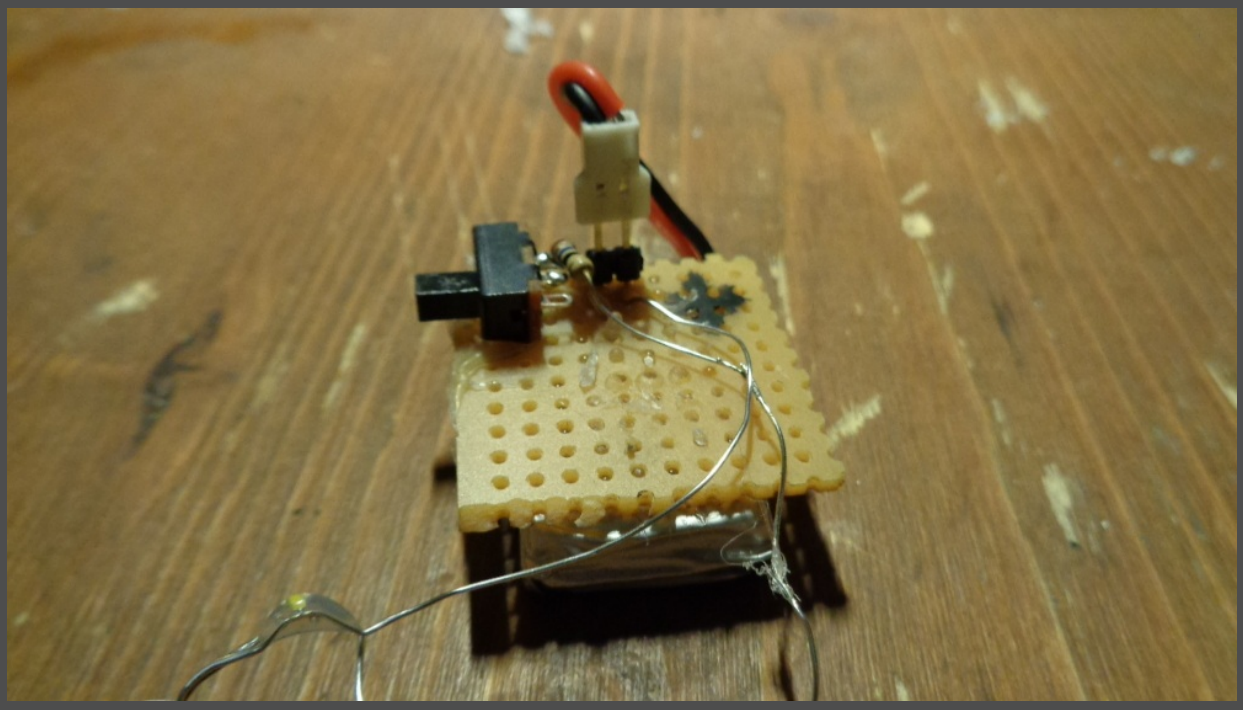






At this point you can see very well how I implemented the connection for the battery. I simply cut a pin header so small that there were only two metal pins left. I soldered them into the hole grid

board and plugged in the battery connector. Here again the tip from a long experience. Never invest too much time in a prototype. If you build and develop more, you will automatically get better. A prototype should only show (yourself or other people) that you know how to make your theoretical idea more concrete. In doing so, mistakes or problems should be detected before going into production. If you want you can carve the case out of a potato, if it is convincing at the presentation almost everything is allowed. Even if there are basic rules that you should follow, the freedom in developing a prototype is already very great. In my case, I just have to convince myself that the idea I'm working on is interesting enough to set my sights on the next milestone.



With this, we have implemented the part for the electronics and will now sit down to the design of the housing. For this we use stronger paper (cardboard) and will implement it quickly and easily. That doesn't have to be stable or scalable, because it's only about presenting an idea in a more pictorial way. You can only do this privately, if you want to show something to an investor or customer you have to invest in better paper (or other material), because it shouldn't look too cheap.

Realisation paper case

When we work with materials that are measured, we need to know the basics of the calculations. This includes, for example, how to calculate the radius of a circle. The formulas are listed here. If you had math in school, you shouldn't have any problems reading them.

```
d = 2 x r
u = 2 x π x r
G = π x r²
M = 2 x π x r x h
O = 2 x π x r (r+h)
    or
    2 x π r² + 2π x r x h
V = π x r² x h
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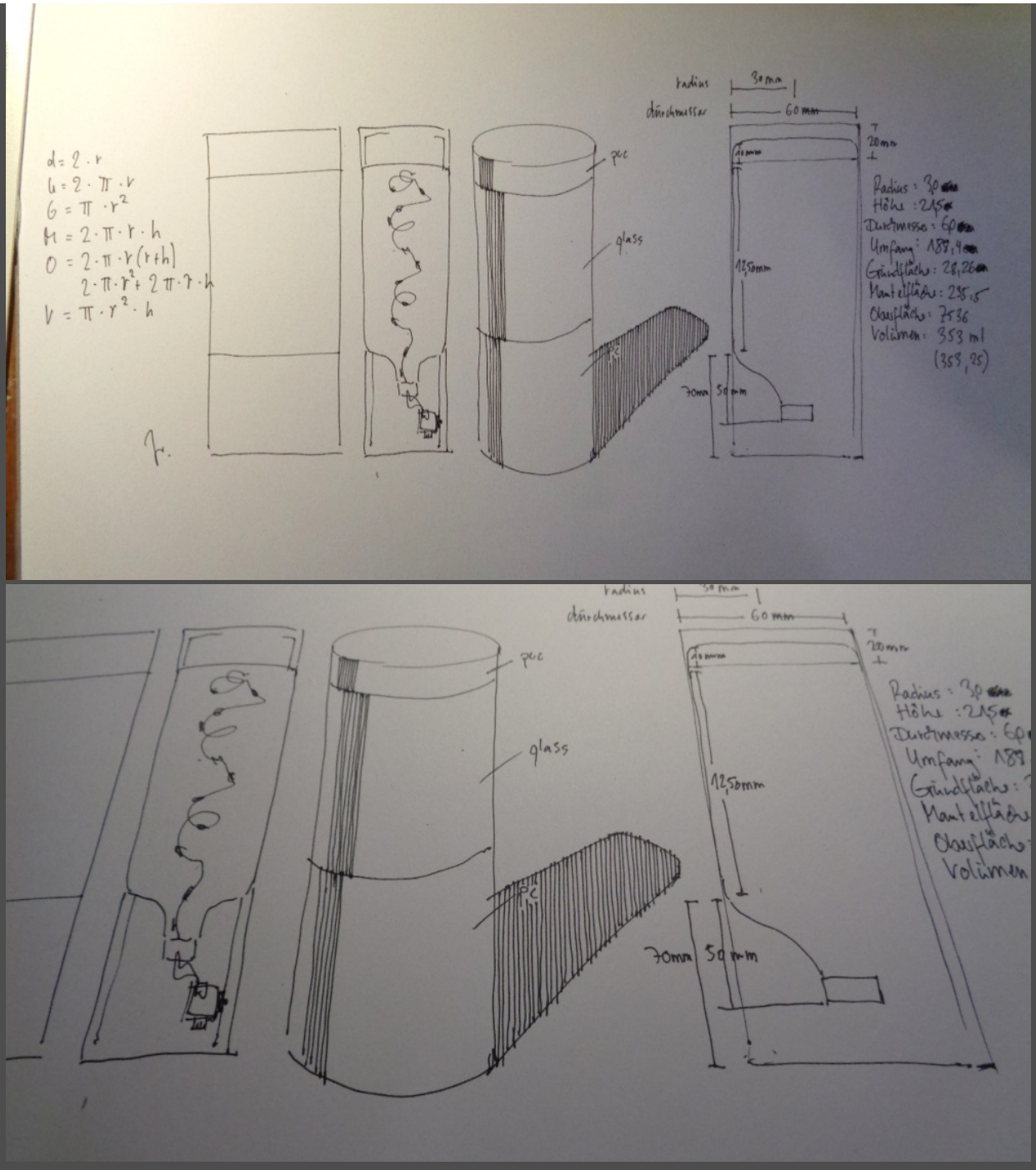
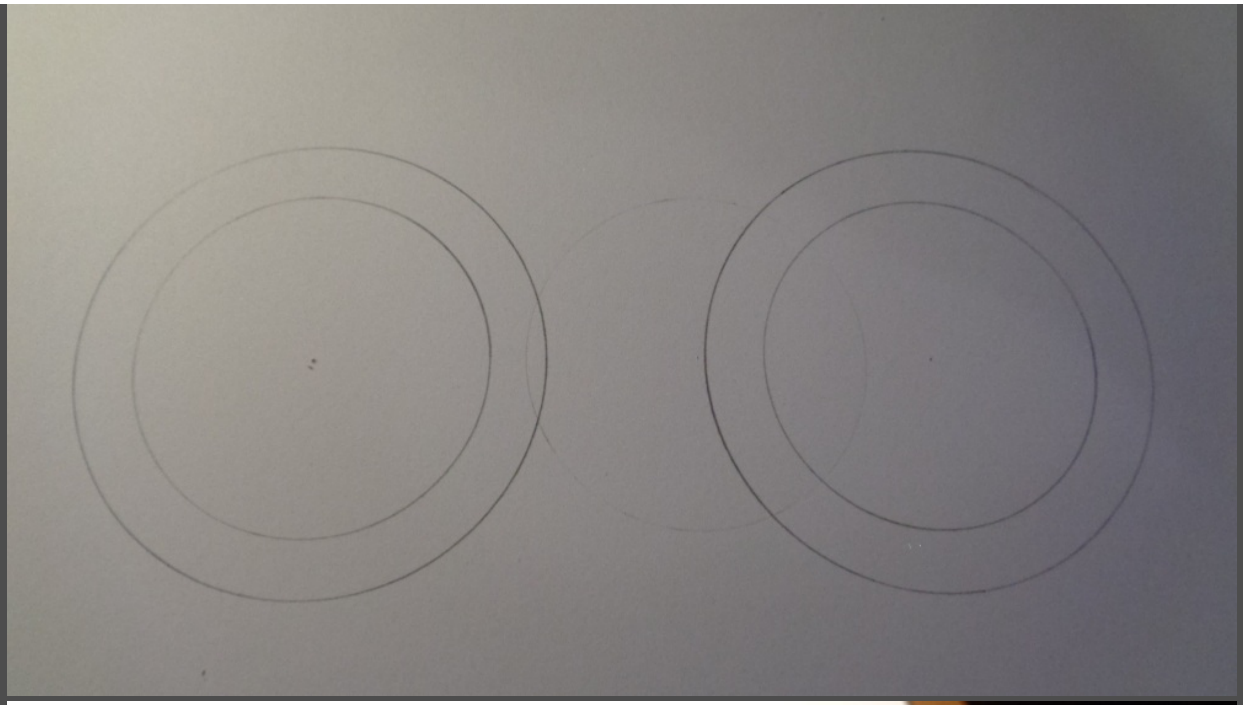
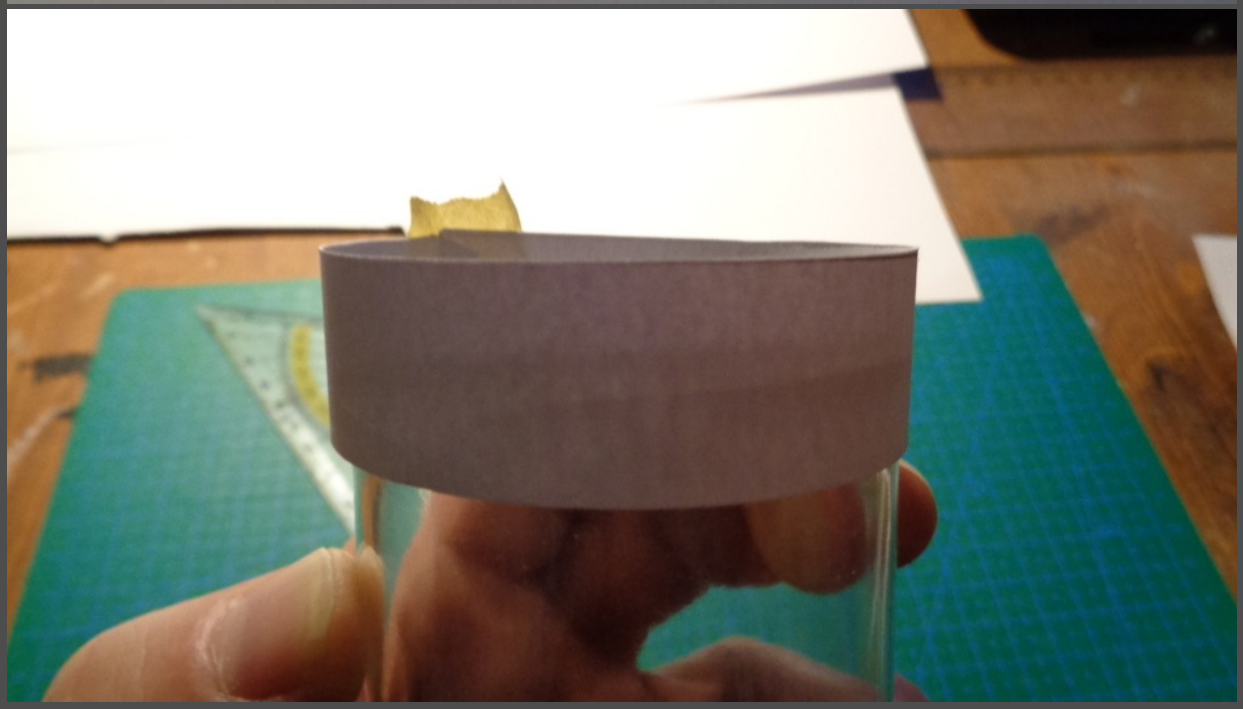
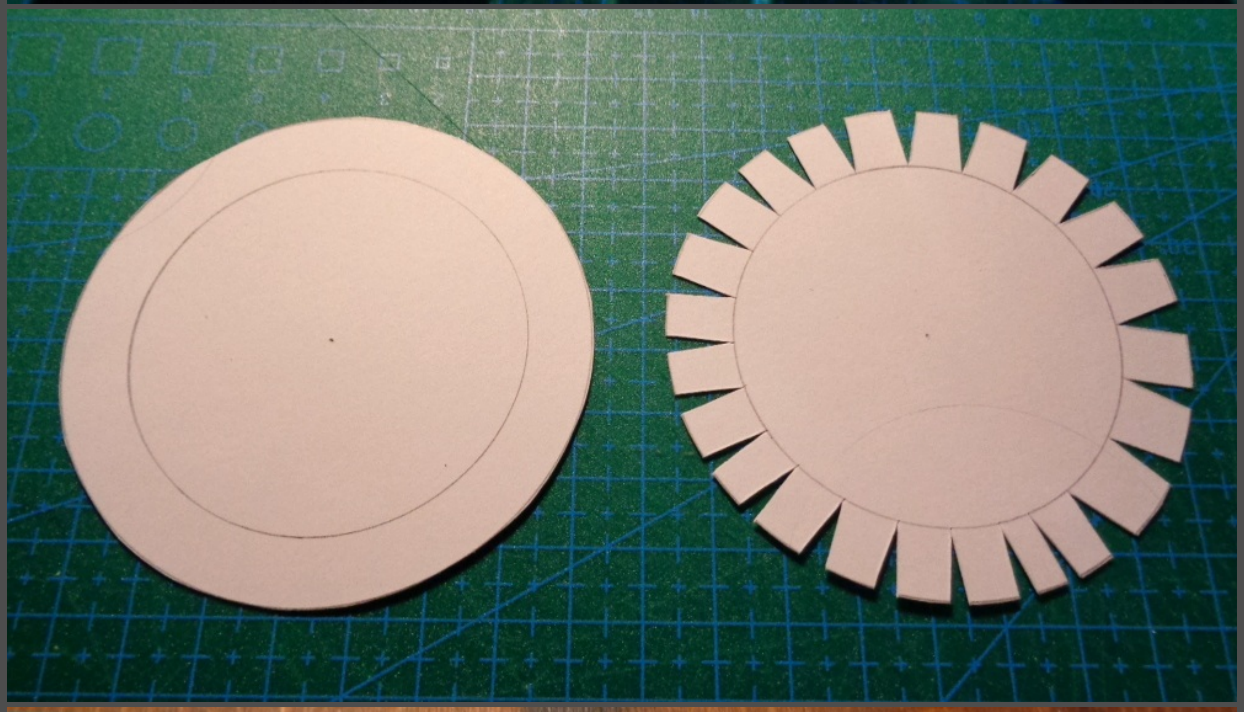


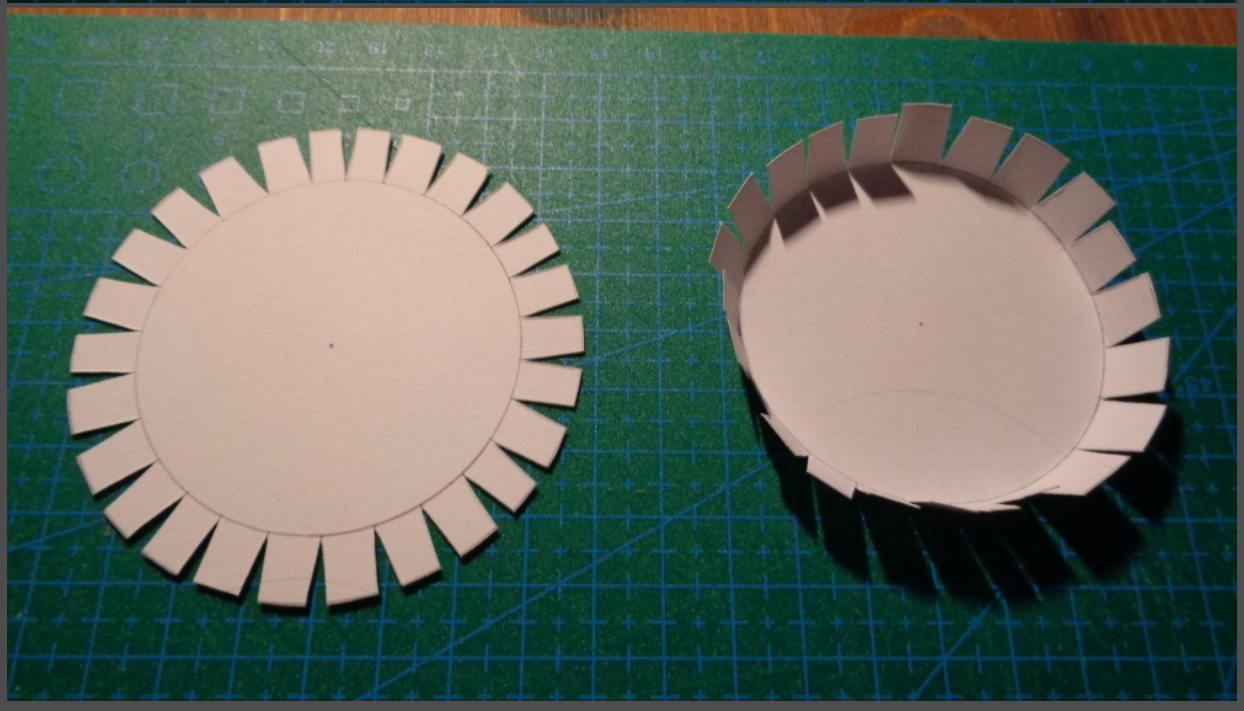
This allows us to calculate everything we need for our paper housing. We need two *lids* the width of the diameter. In addition, we measure another centimetre in width so that we can make tabs for gluing. We need these tabs to be able to connect the *mantle* (the two cut out rectangles) with the lid.

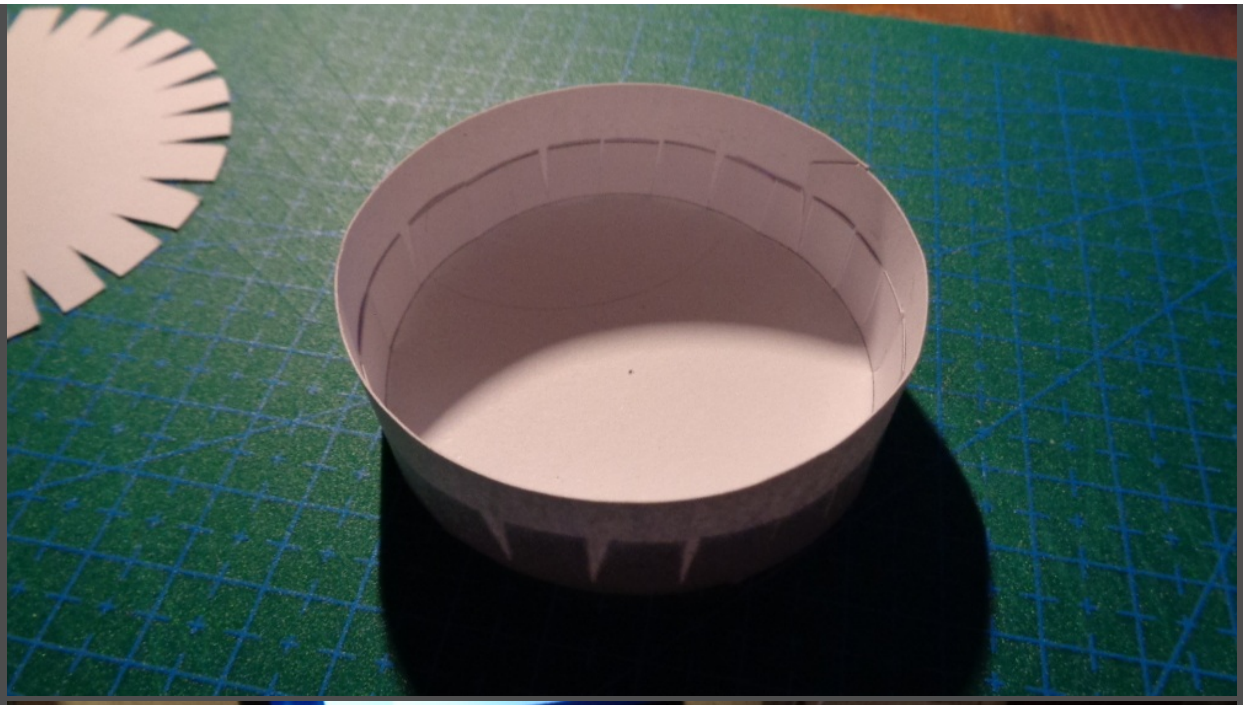




After we have calculated the two rectangles for the mantle and cut them out, we glue the ends with masking tape so that they form a geometric body. We can then hold this to the glass bottle for testing and check our calculations. In the next steps we cut out the lids and form the flaps. A lid is glued together with a mantle.







The case is finished and we only have to place our hole grid board. We drill a small hole in the lid of the bottle and thread the LED through it. Screw the lid back onto the glass bottle. We put the electronics into the lower housing. We don't stick it, because it only has to hold for a short time. Then we turn on our lamp and when it lights up, we have already successfully implemented part of the project. In the summary we come to the theoretical analysis and I briefly describe what I noticed during the creation of the prototype.

Conclusion

I don't have to say much about the design, because it corresponds exactly to my ideas. I wanted round shapes and a minimalist design. With my project, I also want to show that you can create beautiful lamps from simple glass bottles if you connect the shapes with each other and also consider the golden section. I don't see any problems with the lid. The lower housing can be a little bit longer. There are several considerations because of the circuit board. Should I design it round? The circuit board would then also be the lower lid at the same time and with that I could save material/money. The PCB should then be white. Also I must pay attention to use a suitable switch, which looks good at a cylinder. A square switch would disturb the harmony and also be more difficult to implement. Round holes are better drilled into a cabinet. Maybe I should also install a metal ring so that the lamp gets more stability and doesn't tip over at the slightest touch. I could use old materials for this as well. I still have no concrete idea how to fill the bottle. I thought of beads made of glass or marbles that break the light and create beautiful effects with it. Nevertheless, the lamp must also remain functional and one must still be able to read a book, for example.

As you can see these are all considerations that come up during the development of a prototype and you should always have a notepad with you so you can write down your thoughts and ideas quickly. In the next versions I will turn to the material and see what possibilities I have to realize the case. I will deal with PVC first, because it is easy to work with. Metal is out of the question, but I don't have any machines for it. So I have to improvise a little again.